Disclosure of the invention

The invention is further illustrated by four examples which disclose the characteristic features of the invention.

The objects, features and advantages of the invention will become clear from the following description set forth below, in conjunction with the drawings, in which:

FIG. 1 is a block diagram for the writing/reading device.

FIG. 2 is a diagrammatic view of the confocal microscope.

Referring to FIG. 1 an optical system for recording and reading data on optical memory **1** is shown. The experimental system includes: a confocal microscope **2**, vertical scanning systems **3**, **7**, a radial scanning system **4**, a laser (1) **5**, laser (2) **6** and an engine **8** used for rotation of the optical memory **1**. The writing process consists in the irradiation of a selected volume of memory **1** with a light beam of the laser (1). The volume selection is carried out with said confocal microscope **2**, vertical scanning system **3** and radial scanning system **4**. The irradiated volume of fluorescent photosensitive materials suffers a transition (at electronic level for fluorescent photosensitive glasses and at structural level for fluorescent photosensitive vitroceramics) which produces the fluorescence modification. Two procedures could be used for reading. One of this procedures produces the excitation with one-photon process. Laser (2) and vertical scanning system **7** are used in the optical system. The second procedure, which is based on said two-photon process, directs the beam of laser (1) to the specimen.

The confocal microscope (FIG. 2) used in writing processes has the following elements: two pinholes **9**, **10**, the lens **11**, **12**, **13**, **15**, the beam-splitter **14**, the laser **5** and the detector **16**.

The present invention will be illustrated in greater details by the following examples, but the merits thereof are not intended to be limited by the materials, compositions and procedures described in these examples.

Example 1: A Ce, Eu doped fluorescent photosensitive glass is used as a support for the optical memory namely:

Na_2O-P_2O_5-0.005 CeO_2-0.005 Eu_2O_3.

Memory writing is carried out with said laser (1) (XeCl laser) at λ_1 = 308nm and the memory reading is based on said laser (2) Nd:YAG laser with λ_2 = 532 nm.

Example 2 : A fluorescent photosensitive glass is the support of optical memory as a variant of Example 1: $2Na_2O$- $(Y_{0.94}Eu_{0.05}Pr_{0.01})_2O_3$- $5P_2O_5$
The writing process uses a two-photon absorption of laser light. The recording is carried out by a tunable Ti:sapphire laser (1) at λ_1 = 720 nm with 100fs laser pulses. A Nd:YAG laser (2) at λ_2 = 532 nm excites the fluorescent material for said reading process.

Example 3 : A Tb doped fluorescent photosensitive vitroceramic is used for the optical memory (wt%), namely:
~$30SiO_2$-$45PbF_2$-$14Al_2O_3$-$10YF_3$- $1TbF_3$-$0.05Sb_2O_3$-0.01Ag
The recording and reading are based on the two-photon processes. A tunable Ti:sapphire laser (1) with 100fs laser pulses writes at λ_1 = 720 nm and reads at λ_2 = 750 nm.

Example 4 : A similar fluorescent photosensitive vitroceramic as in Example 3 is used for the optical memory (wt%), namely:
~$69SiO_2$-$15.3Na_2O$-5ZnO-$7Al_2O_3$-$0.25Tb_4O_7$-$0.25CeO_2$-$0.2Sb_2O_3$-0.01Ag-$2.3F^-$-$0.7Br^-$. The writing is carried out with a tunable Ti: sapphire laser (1) with 100fs laser pulses using λ_1 = 720 nm while for reading is used λ_2 = 980 nm.